

Docket No. 20154.00

IN THE APPLICATION

OF

**ARTHUR B. DARLING**

FOR A

OIL SEAL REMOVER

## OIL SEAL REMOVER

### BACKGROUND OF THE INVENTION

#### 1. FIELD OF THE INVENTION

The present invention relates to seal pullers. More particularly, the present invention relates to sliding hammer type devices for removing oil seals from vehicle drive line components.

#### 2. DESCRIPTION OF THE RELATED ART

Seal pullers are widely used to service vehicle drive line components. Many seal applications require a special tool for a specific model of a vehicle, particularly in the case of transmissions. Present seal pullers using sliding hammers tend to be complicated in design and thus are expensive and limited in the range of seal sizes and installations they can service. It would be desirable to provide a simple and effective seal puller design which may be used to pull oil seals in a large variety of applications while avoiding damaging the seal housing during the seal pulling process.

U.S. Patent No. 5,848,460, issued December 15, 1998, to Rasmussen et al., describes a bearing puller having an elongate bolt or rod portion along which a load sleeve is slidably engaged.

An eccentric protrusion is formed at one end for engaging blind press fit bearings for removal.

U.S. Patent No. 2,380,068, issued July 10, 1945, to Patton describes an oil seal puller having an expandable grip at one end of a shaft which may be expanded to grip the oil seal. Two collars are placed on the shaft between which a hammer slides to assist in the removal of the seal.

U.S. Patent No. 3,529,497, issued September 22, 1970, to Brooks describes a dowel removing tool having a sliding hammer, a rigid and elongate guide portion, and a tapered impact assembly member.

U.S. Patent No. 5,251,368, issued October 12, 1993, to Somerville et al. describes a sliding hammer seal puller having an intricate expandable seal engaging element.

None of the above inventions and patents, taken either singularly or in combination, is seen to describe the instant invention as claimed. Thus, an oil seal remover solving the aforementioned problems is desired.

#### SUMMARY OF THE INVENTION

The present invention is a sliding hammer type seal puller for removing oil seals from vehicle drive line components. The device comprises a sliding hammer mounted on a steel rod. A handle is mounted at one end of the rod, followed by an impact collar for engagement with the sliding hammer. The other end is flared with

a 90-degree bend at the extreme end. In use, the angled end of the seal puller is inserted into the space created between the shaft and the oil seal after the removal of a drive shaft yoke. The angled end of the device is then maneuvered to engage the inside diameter of the seal. Pulling the sliding hammer backwards unseats the seal, which is then easily disengaged and removed from the housing of the drive line assembly component.

Accordingly, it is a principal object of the invention to provide a vehicle drive line oil seal puller which is useful for a large variety of oil seal applications.

It is another object of the invention to provide an oil seal puller as above which may easily be operated by a single mechanic.

It is a further object of the invention to provide an oil seal puller as above which is simple in design.

Still another object of the invention is to provide an oil seal puller as above which avoids damage to the seal housing during the pulling operation.

It is an object of the invention to provide improved elements and arrangements thereof for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an oil seal remover according to the present invention as seen from the seal engaging end.

5 Fig. 2 is a perspective view of the oil seal remover as above as seen from the handle end.

Fig. 3A is a detail side view of the invention of Fig. 1.

Fig. 3B is a sectional view of the invention of Fig. 3A taken along the lines 3B-3B.

Fig. 4A is a detail plan view of the invention of Fig. 1.

10 Fig. 4B is an end view of the invention as shown in Fig. 4A.

Fig. 5 is a detail bottom view of the invention of Fig. 1.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

15 The present invention is a sliding hammer type seal puller for removing oil seals from vehicle drive line components. The device comprises a sliding hammer mounted on a steel rod. A handle is mounted at one end of the rod, followed by an impact collar for engagement with the sliding hammer. The other end is flared with  
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Referring to Figs. 1 and 2 there are shown perspective views of the inventive sliding hammer seal puller 10. Seal puller 10 comprises a rod 12 having seal engaging end 14 and sliding hammer 16. Sliding hammer 16 is cylindrical in form, slidably mounted on rod 12 and engages impact collar 18 fixedly mounted on rod 12 so as to receive impacts from sliding hammer 16 when the hammer is slid away from engaging end 14. Sliding hammer 16 has an axial bore 20 for slidably engaging rod 12. Seal engaging lip 26 is located at the extreme end of seal engaging end 14. Rod 12 terminates in a handle 36 opposite seal engaging end 14.

Referring to Figs. 3A, 3B, 4A, 4B, and 5, there is shown a detail side view, a sectional view, a plan view, an end view and a bottom view, respectively, of the rod 12 and seal engaging end 14. Seal engaging end 14 comprises a seal engaging end flare portion 22 having a flare portion end 24 from which seal engaging lip 26 extends from ninety degree bend 28. Seal engaging lip 26 ends in free end 30. Flare portion 22 tapers toward seal engaging lip 26 forming seal engaging end upper taper wall 32 and seal engaging end lower taper wall 34. Seal engaging end upper taper wall 32 is concave to match the cylindrical wall of a shaft(not shown) and lower taper wall 36 is correspondingly convex to match the inner wall of a seal(not shown) as shown in Figs. 3A and sectional 3B

near seal engaging lip 26 resulting in a curved end 24 in a crosswise direction. Seal engaging lip 26 is preferably curved crosswise to conform with the curved end 24 (see Fig. 4A and 4B). Free end 30 is flat lengthwise but is preferably curved crosswise to match the concave upper taper wall 32.

In operation, flare portion end 24 of flare portion 22 is inserted through the center of a bearing by introducing the end 24 at an angle, squaring rod 12, and moving seal engaging lip over the inner surface of the bearing. The handle 36 is held and sliding hammer 14 is slid along rod 12 until impact with impact collar 18. The impact results in dislodging of the seal from its housing, allowing pulling pressure exerted on rod 12 by the mechanic to remove the seal from its housing.

Flare portion end 24 and seal engaging lip 26 form a flat surface as shown in the figures. The corners of seal engaging lip 26 should be rounded to avoid damaging the seal housing when removing the seal. The rod 12 may be tubular steel in which case the seal engaging end may be formed by pressing opposite sides of rod 12 near its end to form the flare portion. The flare portion end may then be cut at a right angle and the seal engaging lip added. Alternatively, the rod and seal engaging end may be machined and welded up from stock material.

The inventive oil seal puller is preferably constructed of steel, but any other suitable material may be used.

It is to be understood that the present invention is not limited to the embodiment described above, but encompasses any and all embodiments within the scope of the following claims.